

XXII.—*Catalogue of Irish Entozoa, with observations.* By O'BRYEN BELLINGHAM, M.D., Fellow of and Professor of Botany to the Royal College of Surgeons in Ireland, Member of the Royal Zoological, Geological and Natural History Societies of Dublin, &c.

[Continued from p. 105.]

### Order 1. NEMATOIDEA.

#### Genus 8. ASCARIS.

(Derived from ἀσκαρίζω, *salio*.)

Body cylindrical and elastic, attenuated more or less at the extremities. Mouth terminal, provided with three tubercles, one of which is superior, two inferior. Anus a transverse cleft close to the posterior extremity. Male organ a double spiculum without any sheath. Female organ opening externally about the junction of the anterior with the middle third of the body.

The name *Ascaris* was given to this genus by Linnæus on account of the liveliness of the motions of some of the species, and it has been adopted by all zoologists since. The species are very numerous, 140 being enumerated by Rudolphi in his 'Synopsis.' They occur in mammalia, birds, reptiles and fish; their most common habitat is the alimentary canal.

Rudolphi has made three divisions of the genus.

The first contains the species which are equally attenuated at each extremity.

The second, those in which the anterior extremity has a greater diameter than the posterior.

The third, those in which the posterior extremity has a greater diameter than the anterior.

Each of these divisions Rudolphi has again subdivided according as the head is provided with lateral membranes (what he calls winged), or as this part is naked or destitute of these appendages.

*Corpore utrinque æqualiter attenuato; capite nudo.*

1. *Ascaris lumbricoides*\*. Small intestines of man (*Homo*).

\* The *Ascaris lumbricoides* (or common round worm of the human intestines) has been known longer than any other species of Entozoon; it is included in Pennant's and Turton's list of the British species; it is not peculiar however to the human subject, for it occurs also in the intestines of the ass, wild-boar, pig and ox: the species found in the horse, although for a long time confounded with it, and resembling it in some points, is now known to be distinct.

The *Ascaris lumbricoides* inhabits the small intestines of the human subject; the female is much larger than the male, and is much more

2. { *Ascaris megalcephala* \* (Cloquet). { Small intestines of horse  
 ——— *Equi* (Turton) . . . . . { (*Equus Caballus*).
3. ——— *vesicularis* † { Cæca of partridge (*Perdix cinerea*).  
 { Cæca of quail (*Perdix Coturnix*).  
 { Cæca of pheasant (*Phasianus Colchicus*).  
 { Cæca of chicken (*Gallus domesticus*).  
 { Cæca and rectum of shieldrake (*Tadorna Bel-  
 lonii*).  
 { Cæca of peacock (*Pavo cristatus*).

common : this species is more frequently met with in early life than in the adult, and is said to have been found in one-fifth of the individuals examined between the ages of three and ten ; it is very rare in old age. In ninety cases in which I examined the intestinal canal of patients who died in St. Vincent's Hospital, Dublin, I found this species only twice, and then only a single specimen; the subjects were both adults ; of these ninety cases however only five were under ten years of age, the period at which this species is most frequent. The *Ascaris lumbricoides* occurs sometimes in considerable numbers, and its size is in general in an inverse ratio to the number which exist in the same individual. The penis of the male is very frequently found projecting ; it is double, and it appears strange that so accurate an observer as Cloquet should have described it as being single.

\* The *Ascaris megalcephala* (*Ascaris Equi* of Turton's 'British Fauna') is a common inhabitant of the small intestines of the horse, and was considered by many to be identical with the *Ascaris lumbricoides*, until M. Jules Cloquet (in a memoir which obtained the prize of the Royal Academy of Sciences of Paris in the year 1818) pointed out several material particulars in which it differs from it, and being satisfied that it is a distinct species, he named it *Ascaris megalcephala*, from the large size of the tubercles which surround the mouth ; indeed any one who places the two species side by side must be struck with their dissimilarity. Thus the body of the *Ascaris megalcephala* is much thicker in proportion to its length, and the tubercles surrounding the mouth are considerably larger than in the *Ascaris lumbricoides*. The vulva and the circular depression upon the body of the female are nearer the anterior extremity, the vagina is also longer, and the intestinal canal much larger than in the *Ascaris lumbricoides*.

† The females of the *Ascaris vesicularis* from the cæca of the domestic fowl resemble the female *Ascaris vermicularis* of the human subject, the posterior extremity being subulate ; in the males it is obtuse, terminates in a short mucro, and the body at this part appears to be edged by a lateral membrane. The penis, apparently a single filament, projected externally in all.

The specimens of *Ascaris vesicularis* from the pheasant agree with Rudolphi's description of the species, except that in the females the body has a greater diameter anteriorly than posteriorly. The anterior extremity is inflexed, the concavity towards the abdominal sur-

- |                               |   |  |
|-------------------------------|---|--|
| 4. <i>Ascaris inflexa</i> . . | } | Small intestine of chicken ( <i>Gallus domesticus</i> ).         |
|                               |   | Peritonæum of sea-scorpion ( <i>Cottus Scorpius</i> ).           |
| 5. ——— <i>constricta</i>      | } | Peritonæum of dab ( <i>Platessa Limanda</i> ).                   |
|                               |   | Peritonæum of pipe-fish ( <i>Syngnathus Acus</i> ).              |
| 6. ——— <i>rotundata</i>       | } | Peritonæum of pouting ( <i>Gadus luscus</i> ).                   |
|                               |   | Stomach and intestines of sturgeon ( <i>Acipenser Sturio</i> ).  |
| 7. ——— <i>osculata</i> . .    | } | Stomach of skate ( <i>Raia Batis</i> ).                          |
|                               |   | Peritonæum of cod ( <i>Gadus Morrhuæ</i> ).                      |
| 8. ——— <i>acuminata</i> *     | } | Œsophagus and posterior nares of seal ( <i>Phoca vitulina</i> ). |
|                               |   | Small intestine of frog ( <i>Rana temporaria</i> ).              |
|                               |   | Small intestine of water-newt ( <i>Triton palustris</i> ).       |

*Capite alato.*

- |                                 |   |   |
|---------------------------------|---|---|
| 9. {                            | } | Small intestine of dog ( <i>Canis familiaris</i> ).                 |
| <i>Ascaris marginata</i> † . .  |   |   |
| 10. ——— <i>Canis</i> (Turton)   |   |   |
| 11. {                           | } | Small intestine of fox ( <i>Canis Vulpes</i> ).                     |
| <i>triquetra</i> . . . .        |   |   |
| 12. {                           | } | Stomach and small intestine of cat ( <i>Felis maniculata</i> ).     |
| <i>mystax</i> ‡ . . . .         |   |   |
| 13. ——— <i>Felis</i> (Turton)   |   |   |
| 14. {                           | } | Small intestine of moor-buzzard ( <i>Buteo rufus</i> ).             |
| <i>depressa</i> . . . .         |   |   |
| 15. ——— <i>depressa</i> . . . . |   | Small intestine of sparrow-hawk ( <i>Accipiter fringillarius</i> ). |
|                                 |   | Small intestine of eared owl ( <i>Otus vulgaris</i> ).              |

face; in the males it is in the opposite direction. The posterior extremity of the body of the female is subulate; in the male it is more abrupt, but ends in an exceedingly fine and short mucro. The penis, which appeared to be single in some, double in other specimens, was commonly protruded. The males and females are very nearly of the same length, viz.  $4\frac{1}{2}$  lines; their colour is white. The œsophagus is long, straight, and nearly of the same diameter until it joins the stomach, where it increases in size; the stomach is globular or pyramidal. The intestine is straight, diminishes slightly in diameter posteriorly; it is surrounded by the convolutions of the ovary, which are long; in the male it is surrounded by a shorter spermatic tube.

\* The *Ascaris acuminata* is very common in the small intestine of the frog (*Rana temporaria*): I have found a species in the intestinal canal of the common water-newt (*Triton palustris*) which appears to be identical with it. The longest measure 8 lines; they are very slender, colour white, equally attenuated at each extremity. The posterior extremity is acuminate, the mucro long and somewhat triangular; the head is obtuse, the tubercles of the mouth distinct.

† The *Ascaris marginata* is probably the *Asc. Canis* of Turton's 'British Fauna'; it is very common in the small intestine of the dog.

‡ The *Ascaris mystax* is the *Asc. Felis* of Turton and Pennant, who

- |                                |   |  |
|--------------------------------|---|--|
| 13. <i>Ascaris ensicaudata</i> | } | Small intestine of blackbird ( <i>Turdus Merula</i> ).         |
|                                |   | Small intestine of missel-thrush ( <i>Turdus viscivorus</i> ). |
| 14. ——— <i>nigrovenosa</i> *   |   | Lungs of frog ( <i>Rana temporaria</i> ).                      |
| 15. ——— <i>acus</i> † . . . .  | } | Intestines of herring ( <i>Clupea Harengus</i> ).              |
|                                |   | Intestines of salmon-trout ( <i>Salmo Trutta</i> ).            |
| 16. ——— <i>angulata</i> ..     | } | Intestine of fishing-frog ( <i>Lophius piscatorius</i> ).      |

*Parte antica crassiore ; capite alato.*

- |                                   |   |
|-----------------------------------|---|
| 17. <i>Ascaris vermicularis</i> ‡ | Large intestine of man ( <i>Homo</i> ).             |
| 18. ——— <i>obelata</i> § ..       | Cæcum of mouse ( <i>Mus Musculus</i> ).             |
| 19. ——— <i>maculosa</i> ..        | Small intestine of pigeon ( <i>Columba Livia</i> ). |

describe the head as having a white oblong vesicle upon each side. It is extremely common in the stomach and small intestine of the domestic cat.

\* The *Ascaris nigrovenosa*, named so from its colour, is not infrequent in the lungs of the frog (*R. temporaria*). This species is described as being viviparous: I have not observed that it is so; on some occasions, when cut across, I have seen a number of bodies resembling ova protruded, which were white and oblong, but hardly visible to the naked eye.

† The *Ascaris acus* from the intestine of the salmon-trout (*Salmo Trutta*) lived in water for some days after being removed; they are an inch and upwards in length, white, slender, and very elastic; the alæ of the anterior extremity are very narrow and appear to be crenate. The tubercles of the mouth are prominent and of a moderate size; the posterior extremity is sharp and subinflected in the male; the male is shorter and slenderer than the female.

‡ The *Ascaris vermicularis*, maw or thread-worm of English writers (*Oxyuris vermicularis* of Bremser), is the smallest species which inhabits the intestinal canal of the human subject, and has been known from a very remote period. It inhabits only the large intestine: the male is extremely minute and very rare; the female is much larger in proportion, and is very common. The three tubercles which surround the mouth and characterize the genus are minute, and if the specimen has been kept in spirits for some time, indistinct; indeed Bremser, from not having been able to distinguish these parts, and from the general resemblance of the animal to the *Oxyuris ambigua* of the rabbit, has removed it from the genus *Ascaris*; while Rudolphi, an equally high authority, has retained it in this genus, and succeeding writers have referred it to the genera *Oxyuris* or *Ascaris*, as they followed Rudolphi or Bremser. I have on several occasions satisfied myself that it is an *Ascaris*, and consequently Bremser was mistaken in placing it in the genus *Oxyuris*.

§ The *Ascaris obvelata* is a rare species; it resembles generally the *Ascaris vermicularis* of the human subject, and like it inhabits chiefly



## Capite nudo.

20. *Ascaris dentata*. Intestine of bearded loach (*Cobitis barbatula*).

*Parte postica crassiore ; capite nudo.*

21. *Ascaris brevicaudata* \*. Large intestine of frog (*Rana temporaria*).

22.	{	<i>Ascaris spiculigera</i> † <i>Carbonis</i> (Turton) . . . . .	{	Œsophagus and crop of cormorant ( <i>Phalacrocorax Carbo</i> ). Crop of crested cormorant ( <i>Phalacro-</i> <i>corax cristatus</i> ). Crop of <i>Mergus Merganser</i> . Œsophagus and crop of pomarine skua ( <i>Lestris pomarinus</i> ).
-----	---	---	---	--

the cæcum ; the tubercles of the mouth are however more distinct. The vagina is prominent, seated nearer the anterior than the posterior extremity of the body ; the posterior extremity is subulate and incurved in some specimens. In none of my specimens was I able to distinguish the lateral membranes of the head.

\* The *Ascaris brevicaudata* is not unfrequent in the large intestine, and in the small intestine near the large of the frog (*Rana temporaria*). In the months of June and July I have kept this species alive for four days in a vessel of water. When first placed in it they moved about very briskly, and many of the females soon protruded numerous young ; these were expelled singly from the vulva and immediately began to move about ; they were white, very small, and hardly visible to the naked eye ; hence the *Asc. brevicaudata* is viviparous.

The females of this species are about  $3\frac{1}{2}$  lines in length, the males from 2 to  $2\frac{1}{2}$  lines ; the body of the male is nearly of the same diameter throughout ; in the female it is slightly thicker posteriorly ; they are short and thick in proportion to their length, the male being slenderer than the female. In both sexes the posterior extremity terminates in a short mucro ; in some of the males this is curved inwards, in others it is straight. The penis does not project in any of the males, but a short tube does in several ; no lateral membrane is visible on the head.

This species appears to be perfectly distinct from the *Ascaris acuminata* which occurs in the small intestine of the same animal ; 1st, in being viviparous ; 2nd, in not being equally attenuated at each extremity, and in being short and thick in proportion to its length ; the *Ascaris acuminata* is double the length and more slender, and the mucro which terminates the body is long.

† The *Ascaris spiculigera* is the *Ascaris Carbonis* of Turton and Pennant, and is very common in the crop of the cormorant (*Phalacrocorax Carbo* and *cristatus*) ; it sometimes occurs in immense numbers. It has probably been named *spiculigera* from the length of the penis of the male, which is generally found projecting. On one occasion I found this species firmly adherent by the anterior extremity to the mucous membrane of the crop ; this was the only instance in which I met with an *Ascaris* adherent ; they are almost always free in the alimentary canal.

- |     |                                |   |   |
|-----|--------------------------------|---|---|
| 23. | <i>Ascaris variegata</i>       | { | Esophagus of <i>Colymbus septentrionalis</i> .<br>Esophagus and crop of kittiwake gull ( <i>Larus tridactylus</i> ).<br>Esophagus and crop of razor-bill ( <i>Alca Torda</i> ).   |
| 24. | ——— <i>obtusocaudata</i>       | { | Stomach and intestine of trout ( <i>Salmo Fario</i> ).  |
| 25. | ——— <i>labiata</i> ..          | { | Intestines of eel ( <i>Anguilla acutirostris</i> ).<br>Peritonæum of herring ( <i>Clupea Harengus</i> ).<br>Peritonæum of lump-fish ( <i>Cyclopterus Lumpus</i> ).<br>Peritonæum and intestine of salmon ( <i>Salmo Salar</i> ).<br>Peritonæum of cod ( <i>Gadus Morrhua</i> ).<br>Peritonæum of whiting ( <i>Merlangus vulgaris</i> ).<br>Peritonæum of hake ( <i>Merluccius vulgaris</i> ).<br>Peritonæum of ling ( <i>Lota Molva</i> ).<br>Peritonæum of holibut ( <i>Hippoglossus vulgaris</i> ).<br>Peritonæum of turbot ( <i>Pleuronectes maximus</i> ).<br>Peritonæum of conger-eel ( <i>Anguilla Conger</i> ).<br>Peritonæum of frog-fish ( <i>Lophius piscatorius</i> ).<br>Peritonæum of gurnard ( <i>Trigla Gurnardus</i> ).<br>Peritonæum of mackerel ( <i>Scomber Scomber</i> ).<br>Peritonæum of pipe-fish ( <i>Syngnathus Acus</i> ).<br>Stomach, intestine, peritonæum and gall-bladder of dog-fish ( <i>Squalus Acanthias</i> ). |
| 26. | ——— <i>capsularia</i> *        | { | Small intestine of golden plover ( <i>Charadrius pluvialis</i> ).   |
| 27. | ——— <i>heteroüra</i> (Creplin) | { | Intestine of gudgeon ( <i>Cyprinus Gobio</i> ).   |
| 28. | ——— <i>cuneiformis</i> .       | { |   |

\* The *Ascaris capsularia* is mentioned by Rudolphi as occurring only in a single species of fish (the salmon), whereas I have found it in *fifteen different species*; it inhabits almost exclusively the peritonæum. This species is very common in the peritonæal cavity of the herring (*Clupea Harengus*); it is exceedingly active, and so tenacious of life, that I have kept it alive in a vessel of fresh water for twenty-nine days. The three tubercles which surround the mouth are very small; the whole tract of the intestinal canal can be seen through the parietes when the animal is alive, but there is no appearance of a convoluted ovary surrounding it. The stomach is whiter and more opake than any other part of the alimentary canal, and is visible through the parietes as a longitudinal white and short line, which is very characteristic of this species.

*Capite alato.*

- |                                |   |  |
|--------------------------------|---|--|
|                                | }   | Intestine and peritonæum of salmon ( <i>Salmo Salar</i> ).                     |
|                                |   | Intestine of salmon-trout ( <i>Salmo Trutta</i> ).                             |
|                                |   | Stomach and peritonæum of cod ( <i>Gadus Morrhua</i> ).                        |
|                                |   | Stomach and intestine of haddock ( <i>Gadus Æglefnus</i> ).                    |
| 29. <i>Ascaris clavata</i> *   |   | Intestines of whiting ( <i>Merlangus vulgaris</i> ).                           |
|                                |   | Stomach and intestine of hake ( <i>Merluccius vulgaris</i> ).                  |
|                                |   | Stomach and intestine of whiting-pollach ( <i>Merlangus Pollachius</i> ).      |
|                                |   | Intestines of coal-fish ( <i>Merlangus Carbonarius</i> ).                      |
|                                |   | Stomach and intestine of conger-eel ( <i>Anquilla Conger</i> ).                |
|                                |   | Peritonæum of mackerel ( <i>Scomber Scomber</i> ).                             |
| 30. ——— <i>collaris</i> . .    |   | Intestine of turbot ( <i>Pleuronectes maximus</i> ).                           |
|                                |   | Intestines and pyloric appendages of holibut ( <i>Hippoglossus vulgaris</i> ). |
| 31. ——— <i>tenuissima</i> .    | Intestine of whiting ( <i>Merlangus vulgaris</i> ).   |  |
| 32. ——— <i>succisa</i> . .     | Intestine of lump-fish ( <i>Cyclopterus Lumpus</i> ). |  |
| 33. ——— <i>alata</i> , mihi †. | Intestines of man ( <i>Homo</i> ).                    |  |

\* The *Ascaris clavata* is mentioned by Rudolphi as occurring in only three species of fish; I have found it in *ten different species*; it is extremely common in the cod, and sometimes grows to a large size. This species lived in a vessel of fresh water for four days after being removed from its natural habitat.

† The species of *Ascaris* to which I have ventured to give the name *Asc. alata*, from the distinctness of the lateral membranes of the head, is very rare; I only met with it once, and then obtained only two specimens. These are both females; they measure  $3\frac{1}{2}$  inches in length, and are half a line in width anteriorly, and three-fourths of a line posteriorly; the anterior extremity is inflexed, the posterior straight. The anterior extremity is provided upon each side with a very distinct semitransparent membrane a line and a half in length. In general appearance the *Ascaris alata* resembles the *Asc. mystax*, which is common in the domestic cat; it differs however in being of a greater diameter posteriorly than anteriorly.

Although this species has not been previously described, it would appear that one closely resembling it had been already observed in this country. In the fourth and fifth vols. of the 'Transactions of the Association of the King and Queen's College of Physicians' is contained a very interesting case, in which great numbers of insects and their larvæ were voided by a female residing in the county Cork; upon several occasions the *Ascaris lumbricoides*, and a species resembling this, were voided also by the same female. Dr. J. V. Thom-

*Species dubiæ.*

34. *Ascaris*. Small intestine of plover (*Charadrius Hiaticula*).  
 35. ———. Crop of shearwater (*Procellaria Anglorum*).  
 36. ———. Small intestine of sea-swallow (*Sterna Hirundo*).  
 37. ———\*. Peritonæum of loach (*Cobitis barbatula*).  
 38. ———. Peritonæum of heron (*Ardea cinerea*).  
 39. ———. Œsophagus of *Mergus Merganser*.  
 40. ———†. Stomach and intestine of skate (*Raia Batis*).  
 41. ———. Intestine of lump-fish (*Cyclopterus Lumpus*).  
 42. ———. Small intestine of widgeon (*Mareca Penelope*).

son, who examined and figured it, says it resembled the *Ascaris* of the cat, but may probably prove to be a distinct species. A full account of this species, with a figure of the head and anterior extremity, is contained in the first vol. of the 'Dublin Medical Press.'

\* This species, of which I found several specimens in the peritonæum of the common loach (*Cobitis barbatula*), differs in many respects from the *Ascaris dentata* which inhabits the intestine of the same animal. It is equally attenuated at each extremity, while in the other the anterior extremity is thicker than the posterior; the head is winged, while that of the *Asc. dentata* is naked. They are about three lines in length, very slender, and of a white colour; they lived in a vessel of fresh water for twenty-four hours. They are remarkable in this respect, and differ from most species which I have seen in the length of the lateral membranes of the head, which extend along the anterior third of the body, and are of the same width throughout. The posterior extremity of the animal has a somewhat triangular shape.

† In the stomach and intestine of the skate (*Raia Batis*) I have found, upon different occasions, specimens of an *Ascaris* which differ somewhat from one another, and do not seem to have been previously observed. In all the posterior extremity is thicker than the anterior, and the head is naked; they are about an inch or a little more in length; colour very white; the tubercles of the mouth are small, in some specimens slightly prominent, and appear to be surrounded by a prominent margin, which is wanting in other specimens; the anus projects considerably in some; at the junction of the anterior with the posterior three-fourths of the body, a circular contraction of its diameter is observed (as in the *Ascaris lumbricoides*) in the centre of the abdominal surface of which the vulva is situated, in the form of a little papilla; this appearance is not to be seen in the specimens found at a different period. Both, however, have so many characters in common that they can hardly be considered to be distinct species.

[To be continued.]